REMARKS

The claims are 1-36 with claims 1, 23 and 41 being independent.

Former claims 1-22 were withdrawn as non-elected. In the event of allowable subject matter Applicant requests rejoinder of claims 1-22 under M.P.E.P. §821.04. Accordingly, to facilitate rejoinder Applicant requests an opportunity to amend the method claims to be commensurate in scope with the product claims once allowable subject matter has been indicated.

Claims 23-25, 27-30, 32, 33, 35, 40 and 41 were rejected as anticipated by Ozin '666. Claims 31, 34 and 36-38 were rejected as obvious over Ozin in view of either Itoh, Ward or Leung, respectively. The Examiner argues that Ozin teaches a uniaxially oriented mesostructure thin film in column 5, lines 1-25. The grounds of rejection are respectfully traversed.

Prior to addressing the grounds of rejection Applicant wishes to briefly review certain key features and advantages of the present claimed invention. As noted on specification page 8, it is important to uniaxially orient the pores of the mesostructured thin film. This provides the mesostructured thin film with good uniformity and continuity. Applicants has determined that the claimed polymer compound with a sequence of two or more adjacent methylene groups in the repeating unit will facilitate formation of a film having a mesostructured with excellent uniaxial orientation. To provide the uniaxial orientation of the rod-shaped porous structure, the claimed polymer compound can be rubbed or an LB film of the polymer can be utilized, among other possible embodiments.

Accordingly, it is a key feature of the present claimed invention that a mesostructured thin film having uniaxially oriented rod-shaped pores is formed on a polymer compound (which is treated to promote uniaxial orientation or an LB film) and containing a specific sequence of two or more adjacent methylene groups which then facilitates proper uniaxial orientation for the pore structure.

As noted on specification pages 20 and 21 it is important to form a structure with long and narrow domains oriented uniaxially, for example, to a rubbing direction. When evaluating the uniaxial orientation of the mesochannel it is important that the direction of the pores and their distribution be perpendicular to an orienting direction along their long axis.

In present Comparative Example 1, even when rubbed, if the film was formed on a substrate with a polymer with no methylene group (page 28), then the resulting mesochannel was found to be curved at the end portions (as shown in Fig. 7) which resulted in an inferior uniaxial orientation. Accordingly, both selection of a specific polymer and of an orienting treatment is necessary where the mesostructure film is formed on an organic polymer to achieve proper uniaxial pore orientation.

Ozin '666 discloses that forming uniaxially oriented mesostructure films requires special conditions. As noted in column 6, lines 18-22, the films are preferably mounted on an oriented crystalline substrate as a silicon chip, graphite or the like. When forming the mesostructure thin film on a single crystal substrate as mica or on graphite, the resulting film can be a mesoporous silica having uniaxially oriented pores. This technique is known to the art. This disclosure in column 4, lines 1-9 of Ozin '666 relates to such films (formed on single crystals of mica or graphite).

However, Ozin '666 also teaches that a mesoporous silica structure is formed at an air-water interface (Example 1), an air-high density polyethylene interface (HDPE) (Example 2) or an air-water interface (Example 3). Ozin '666 does not teach that such a formed mesostructure is uniaxially oriented.

In Column 4, lines 9-15, Ozin '666 discloses synthesizing mesoporous silica film according to the techniques provided in an article by Ozin, Yang and Coombs entitled "Thickness control and defects in oriented mesoporous silica films" which was expressly incorporated by reference in Ozin '666. A copy of this article is attached hereto to show what is additionally disclosed in Ozin '666.

The Examiner's attention is directed to page 1205 of the Ozin, et al. article in which a synthesis of a mesoporous silica film was described which is essentially identical to Examples 1 and 2 of Ozin '666. The proportions of CTAC1 (29%); HC1 solution (38%); water and TEOS in the article's experimental synthesis were just about identical to Examples 1 and 2 of Ozin '666.

When such films were grown without special orienting conditions and as disclosed on page 1210 in the "Discussion"section, then TEM images showed that while the channels were initially organized in the plane of the film, they swirled and curled throughout the body of the film to create designs (page 1210, lines 13-24). The "Experiment" in this article which is incorporated in Ozin '666 clearly shows that Examples 1 and 2 of Ozin '666 grow defective pores with swirls and curves.

In a later article of Ozin, Yang and Kresge (copy attached) entitled "The Role of Defects in the Formation of Mesoporous Silica Fibers, Films and Curved Shapes", patentees Ozin and Yang of the '666 Ozin patent disclose that free-standing mesoporous

silica films show spectacularly curved surface contours, as spirals, ribbons, discoids and the like (emphasis supplied).

These papers confirm Applicants' comparative results which show that special conditions such as substrate selection (i.e. single crystals, or rubbing or the like) is required to form quality uniaxially aligned mesoporous films. When mesoporous silica films are formed in Ozin '666 on the HDPE -liquid interface, the mesoporous silica does not have a uniaxially oriented structure along the thickness of the film as shown in the incorporated Ozin et al. article.

Accordingly, Ozin '666 merely teaches that when forming mesoporous silica on a mica substrate, uniaxially oriented pores can be formed, but absent such a structured substrate, there is no inherent formation of a uniaxially oriented structure. Applicants have disclosed that special conditions, such as rubbing, are additionally needed.

Ozin '666 fails to teach or suggest the instant mesoporous silica having a uniaxially aligned structure formed on a specific polymer compound having a sequence of two or more adjacent methylene groups in the repeating unit. Further, in Example 2 of Ozin, a mixture is transferred to a high density polyethylene bottle. A film is then grown at the water-high density polyethylene interface. However, there is absolutely no teaching or suggestion that the polyethylene surface should be oriented by rubbing or the like. Ozin teaches nothing about the need to rub high density polyethylene in order to provide any specific orientation of its surface. Hence, there is nothing in Ozin to teach that the high density polyethylene in Ozin should be considered to be oriented in any specific axial direction. Clearly, one of ordinary skill understands that orientation of polymeric compounds can vary dependent on surface treatment and manufacturing conditions.

The defects and deficiencies of Ozin are not remedied by the secondary references. Neither Itoh or Leung teach that the orientation of the substrate surface on which a film was formed must be considered when forming a uniaxially oriented porous structure.

Ward merely teaches a process for forming a high density polyethylene polymer which is oriented. No mesostructure is formed on the polymer. Ward, in column 2, lines 55-58, teaches that molecular orientation in his polymer is usually uniaxial, although it is possible to produce biaxially oriented polymer materials. Ward teaches that in order to produce an oriented polymer material one must take into account the rate of cooling of the polymer to a specific cooling temperature and the drawing of a polymer at a temperature and rate to provide a specific deformation ratio of at least 15.

Based on Ward, one of ordinary skill would understand that absent any specific disclosure about the type of polyethylene employed, that various types of polyethylene can be utilized including non-oriented, partially-oriented, uniaxially-oriented or biaxially-oriented. Clearly, Ward provides no teaching that in order to provide a uniaxially oriented rod-shaped porous structure, one should utilized a specific polymer compound which should be specifically oriented.

There is no suggestion to combine the Ward disclosure of oriented HDPE with Ozin. Ward teaches that a number of steps must be followed to form an axially oriented polyethylene. If the steps are not precisely followed, then biaxially oriented or a partially oriented product could result. Neither Ward nor Ozin teaches that the mesostructure should be specifically oriented. Ward does not teach or suggest that orienting HDPE will orient a mesostructure.

Accordingly, none of the references, whether considered alone or in combination, discloses or suggests the present claimed invention nor renders it unpatentable.

Applicant's undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

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